REMARKS/ARGUMENTS:

Reconsideration of this application in light of the above amendments is courteously solicited.

Claims 1, 2, 19 and 20 were amended so that the copper base alloy contains both of zinc and tin, and 80 to 1000 ppm of carbon. It is described in Example 6 that the copper base alloy contains 80 ppm of carbon.

The invention as claimed in the amended claim 1 is directed to a copper base alloy consisting essentially of 8 to 45 wt% of zinc, 0.2 to 12.0 wt% of tin, 80 to 1000 ppm of carbon, and the balance being copper and unavoidable impurities. That is, the invention as claimed in the amended claim 1 is directed to a Cu-Zn-Sn alloy (a copper base alloy containing Zn and Sn as essential elements) which contains a predetermined amount of carbon.

As is well known, brasses containing zinc in copper have excellent characteristics, such as excellent workability and press punching quality and low costs, and are utilized as the materials of many electric parts, such as connectors. However, it is required to further improve the strength, spring characteristic, stress relaxation resistance and stress corrosion cracking resistance of brasses in order to cope with the miniaturization of parts and the deterioration of working environments. In such circumstances, there have been proposed methods for improving the above described characteristics by adding a predetermined amount of Sn to a Cu-Zn alloy. Such a Cu-Zn-Sn alloy is formed as a plate having a predetermined thickness usually by a method comprising the steps of carrying out the longitudinal continuous casting, heating the obtained ingot by a heating furnace, extending the heated ingot by hot rolling, and thereafter, repeating cold rolling and annealing. Although the mechanical characteristics, such as tensile

strength and 0.2% proof stress, stress relaxation resistance and stress corrosion cracking resistance of Cu-Zn-Sn alloys can be improved by the addition of Sn, it is desired to improve the hot workability thereof. That is, there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products, so that it is desired to improve the hot workability of Cu-Zn-Sn alloys.

In order to obtain a Cu-Zn-Sn alloy having an improved hot workability, the inventors were diligently studied and found that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. In addition, the inventors have found some methods for efficiently causing the Cu-Zn-Sn alloy to contain carbon although it is difficult to cause the Cu-Zn-Sn alloy to easily contain carbon since the degree of solid solution of carbon in copper is usually small and since the difference in specific gravity between carbon and copper is great.

EP 0872564 discloses copper based alloys consisting essentially of 15 to 35 wt% of Zn, 7 to 14 wt% of Ni, 0.1 to 2 wt% of Mn, 0.01 to 0.5 wt% of Fe, 0.0005 to 0.1 wt% of P, at least one element selected from the group consisting of 0.001 to 0.9 wt% of Si, 0.0003 to 0.02 wt% of Pb, and 0.0003 to 0.01 wt% of C, the total content of the selected at least one element being limited to a range of 0.0006 to 0.9 wt%, and the balance of Cu and inevitable impurities. That is, the copper based alloys disclosed in EP 0872564 are Cu-Zn-Ni-Mn-Fe-P alloys which contain Zn, Ni, Mn, Fe and P as essential elements. However, EP 0872653 fails to disclose or suggest that copper base alloys (Cu-Zn-Sn alloys) containing Zn and Sn as essential elements contain C except for Example 51 (Table 7). Although the copper based alloy of Example 51 includes 0.5 wt% of tin, the content

of C is only 0.0003 wt% which is far smaller than that of the copper base alloy as set forth in the amended claim 1. In addition, EP 0872564 fails to disclose or suggest that it is desired to improve the hot workability of Cu-Zn-Sn alloys since there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products. Moreover, EP 0872564 fails to disclose or suggest that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. Therefore, EP 0872564 fails to disclose or suggest that any copper base alloys as set forth in the amended claim 1, and also fail to disclose or suggest any copper base alloys containing at least one of other additives as set forth in the amended claims 2, 19 and 20.

JP 04013825 discloses Cu alloys containing 28 to 33 wt% of Zn, 4 to 5.5 wt% of Al, 2 to 3 wt% of Ni, 1 to 2 wt% of Ti and 0.01 to 0.2 wt% (100 to 2000 ppm) of C, and the balance being copper and unavoidable impurities. That is, the Cu alloys disclosed in JP 04013825 are Cu-Zn-Al-Ni-Ti alloys which contain Zn, Al, Ni and Ti as essential elements. However, JP 04013825 fails to disclose or suggest any copper base alloys (Cu-Zn-Sn alloys) containing Zn and Sn as essential elements. In addition, JP 04013825 fails to disclose or suggest that it is desired to improve the hot workability of Cu-Zn-Sn alloys since there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products. Moreover, JP 04013825 fails to disclose or suggest that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. Therefore, JP 04013825 fails to disclose or suggest any copper base alloys as set forth in the amended claim 1, and also fails to disclose or suggest any

copper base alloys containing at least one of other additives as set forth in the amended claims 2, 19 and 20.

EP 0411882 discloses copper-base alloys consisting essentially of 5 to 30 wt% of Ni, 0.5 to 3 wt% of B, 1 to 5 wt% of Si, 4 to 30 wt% of Fe, at least one of 3 to 15 wt% of Sn and 3 to 30 wt% of Zn, and the reminder being Cu and unavoidable impurities. That is, the copper-base alloys disclosed in EP 0411882 are Cu-Ni-B-Si-Fe-Sn, Cu-Ni-B-Si-Fe-Zn or Cu-Ni-B-Si-Fe-Sn-Zn alloys which contain Ni, B, Si, Fe and at least one of Sn and Zn as essential elements. Therefore, EP 0411882 discloses copper-base alloys containing Zn and Sn as essential elements. However, EP 0411882 fails to disclose or suggest that a predetermined amount of carbon is contained in the copper-base alloys containing Zn and Sn as essential elements. In addition, EP 0411882 fails to disclose or suggest that it is desired to improve the hot workability of Cu-Zn-Sn alloys since there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products. Moreover, EP 0411882 fails to disclose or suggest that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. Therefore, EP 0411882 fails to disclose or suggest any copper base alloys as set forth in the amended claim 1, and also fails to disclose or suggest any copper base alloys containing at least one of other additives as set forth in the amended claims 2, 19 and 20.

Breedis et al. (USP 6471792) disclose an alpha brass (copper/zinc alloy with less than 39%, by weight, of zinc) stock alloy. Breedis et al. also disclose brass alloys consisting, by weight, of: from 2% to the maximum that maintains an alpha brass microstructure of zinc; from 0.2% to 2% nickel; from 0.15% to 1% tin; from 0.033% to 0.2% phosphorus; optical from 0.07% to 0.25%

iron; from about 2 ppm to about 50 ppm of oxygen, sulfur, carbon or mixture thereof; less than 2% in total of bismuth, lead, tellurium, sulfur and selenium; less than 0.25% each and 1% in total of various elements, such as magnesium; and the balance copper and inevitable impurities. That is, the brass alloys of Breedis are Cu-Zn-Ni-Sn-P alloys which contain Zn, Ni, Sn and P as essential elements. Moreover, Breedis et al. disclose that oxygen, sulfur and carbon may be present in the alloys in amounts typically found in either electrolytic (cathode) copper or remelted copper or brass scrap and that the amount of each of oxygen, sulfur and carbon is typically in the range of from about 2 ppm to about 50 ppm and preferably less than 20 ppm. Therefore, Breedis et al. disclose that copper-base alloys containing Zn and Sn as essential elements may contain a predetermined amount (about 2 ppm to about 50 ppm) of carbon. However, Breedis et al. fail to disclose or suggest that the copper-base alloys contain 80 to 1000 ppm of carbon. In addition, Breedis et al. fail to disclose or suggest that it is desired to improve the hot workability of Cu-Zn-Sn alloys since there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products. Moreover, Breedis et al. fail to disclose or suggest that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. Therefore, Breedis et al. fail to disclose or suggest any copper base alloys as set forth in the amended claim 1, and also fails to disclose or suggest any copper base alloys containing at least one of other additives as set forth in the amended claims 2, 19 and 20.

As described above, none of cited references discloses or suggests that it is desired to improve the hot workability of Cu-Zn-Sn alloys since there are some cases where Cu-Zn-Sn alloys

may be broken during hot rolling to deteriorate the surface quality.and yields of products. In addition, none of cited references discloses or suggests that it is possible to greatly improve the hot workability of a Cu-Zn-Sn alloy by causing the Cu-Zn-Sn alloy to contain a predetermined amount of carbon. Particularly, None of cited references discloses or suggests that a Cu-Zn-Sn alloy contains 80 ppm or more of carbon. Moreover, none of cited references discloses or suggests that it is difficult to cause a Cu-Zn-Sn alloy to easily contain carbon unless any one of specific methods for efficiently causing the Cu-Zn-Sn alloy to contain carbon is used. Therefore, it would not have been obvious to one of ordinary skill in the art to make any copper base alloys as set forth in the amended claims 1, 2, 19 and 20.

Accordingly, it is believed that the amended claims patentably distinguish the invention from the prior art.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,

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I, Rachel Piscitelli, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on January 10, 2006.